

3/1/16


HW: "Exponential Equations" finish w/s

AIM: How do we solve exponential equations with variables in the base?

Warm Up:

1) Rewrite using rational exponents

$$\sqrt[3]{x^5} \rightarrow x^{5/3}$$

 Power
Root

2) What is the multiplicative inverse of -6

$$\rightarrow \left(\frac{1}{-6} \right)$$

HW:

$$4^0 = 1$$

$$1) \quad 4^{2x+3} = 1$$

$$4^{2x+3} = 4^0$$

Put base to zero power

$$x = -\frac{3}{2}$$

$$x = -1.5$$

$$2x + 3 = 0$$

$$\underline{-3 \quad -3}$$

$$2x = -3$$

$$x = -\frac{3}{2}$$

Solve on calc.

y^1 = Left side of equal sign

y^2 = Right side of equalsign

2nd Trace 5

Enter Enter Enter

* Brain Food:

When we solve for a variable, what is the exponent of that variable?

ONE

• Solve for x :

$$1) x^{\frac{2}{3} \left(\frac{3}{2} \right)} = 25^{\frac{3}{2}}$$

Mult inverse of $\frac{2}{3}$

$$x^1 = 25^{\frac{3}{2}}$$

$$x = \pm 125$$

MIT:

* When our variable is raised to an even / odd power

our answer needs \pm

$$x = 125 \text{ and } x = -125$$

Solve for all values of x : To Solve
Do BACKWARDS
PEMDAS^{1st}

$$2) \quad 2x^{-3} - 1 = 15$$

+1 +1

$$\frac{2x^{-3}}{2} = \frac{16}{2}$$

$$x^{-3\left(\frac{1}{3}\right)} = 8^{\left(\frac{1}{3}\right)}$$

Goal: We need
 x^{+1}

$$x = 8^{-\frac{1}{3}} = \left(\frac{1}{8}\right)^{\frac{1}{3}} = \frac{1}{2}$$

$$x = \frac{1}{2}$$

* can be: $\left\{ \begin{array}{l} () \\ [] \\ \sqrt{} \end{array} \right.$

* PEMDAS

In the order you see them
Left to Right
(First MD)
2nd AS

To Evaluate given a value \longrightarrow

\longleftarrow To Solve for a variable

$$\begin{aligned} 3) \quad \frac{2x^{-\frac{1}{4}}}{2} &= \frac{12}{2} \\ x^{-\frac{1}{4}(\frac{-4}{1})} &= 6^{(\frac{-4}{1})} \\ X &= 6^{-4} \\ X &= \frac{1}{1296} \end{aligned}$$

⊛ Use multiplicative inverses to rid yourself of fractional exponents
ex $2 \Rightarrow \frac{1}{2}$
 $-2 \Rightarrow -\frac{1}{2}$

$$4) \quad x^{\frac{3}{5}} - 2 = 25$$
$$\begin{array}{r} +2 \quad +2 \\ \hline x^{\frac{3}{5}(\frac{5}{3})} \quad (\frac{5}{3}) \\ x = 27 \end{array}$$

$$x = 27^{\frac{5}{3}}$$

$$x = 243$$

$$5) \quad 3(2x+3)^{\frac{2}{3}} + 2 = 77$$

$\begin{array}{r} -2 \quad -2 \end{array}$

$$\cancel{3}(2x+3)^{\frac{2}{3}} = \frac{75}{3}$$

$$(2x+3)^{\frac{2}{3} \cdot \left(\frac{3}{2}\right)} = 25^{\left(\frac{3}{2}\right)}$$

$$\begin{array}{r} 2x+3 = 125 \\ -3 \quad -3 \\ \hline 2x = 122 \\ \frac{2x}{2} = \frac{122}{2} \\ \boxed{X=61} \end{array} \quad \text{or} \quad \begin{array}{r} 2x+3 = -125 \\ -3 \quad -3 \\ \hline 2x = -128 \\ \frac{2x}{2} = \frac{-128}{2} \\ \boxed{X=-64} \end{array}$$

* Reminder
 if exponent is even
 the answer is \pm
 (2 answers)

